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SURVEY OF SOVIET HEAVY INDUSTRY (12)

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SURVEY OF SOVIET HEAVY INDUSTRY (12)

This is a series report, published approximately biweekly, which contains items of interest on Soviet heavy industry as reflected in articles, short news items, announcements, etc., appearing in various USSR and other publications. The items contained in this report fall under the broad categories listed below in the table of contents.

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METALLURGY AND MINING

Press-Casting

Work toward introducing the production of press-casting is progressing successfully in the steel smelting shop of the Ryazan' Heavy Forge-press Equipment Plant. This method is much more economical than pressure casting and high-temperature forging. The pressed steel is distinguished by high strenth and uniformity. Products from this type of steel have better mechanical features than by rolling or forging. (Ekonomicheskaya Gazeta, 16 October 1960. Full translation)

Automatic Blooming Mill

The Sverdlovsk Uralmash Plant has designed and is now preparing for the production of the world's largest automatic blooming mill. Only one man will be required to operatee the mill. (Ekonomicheskaya Gazeta, 8 October 1960.)

Metallurgical Cranes

The Krasnoyarsk Sibtyazhmash Plant has made a metallurgical crane for Magnitogorsk. It has a hoisting capacity of 75 tons and an ingot-stripping force of 250 tons. The crane weighs 350 tons.

The plant also sent several cranes with capacities ranging up to 50 tons to China and produced four rotating kilns for the USSR cement industry.

At present the plant is organizing the production of low-profile charging machines, and in 1961 it will produce special gantry cranes for the construction of GES, assembly and foundry cranes. (Ekonomicheskaya Gazeta, 8 October 1960.)

Blast Furnace Compressor

The Kazan' Compressor Plant has recently shipped a powerful new KTK-7 oxygen turbo-compressor to Czechoslovakia. It is designed for blowing oxygen into blast furnaces for increasing metal production. The plant is testing two more of these units to be shipped to the same country. (Ekonomicheskaya Gazeta, 4 October 1960.)

Dump-forming Machines

In 1960 the Druzhkovka Toretskiy Machinery Plant will start production on conveyer-type units equipped with dump-forming machines for the mining industry. The plant recently produced and shipped a unit of this type for the mine-stripping operations of the Orenburgskiy Sovnarkhoz. The machine has a capacity of 1000 cubic metres per hour and will deliver and dump the stripped soil to a distance of three kilometers. (Ekonomicheskaya Gazeta, 18 October 1960)

Drawing Mills

The Alma-Ata Heavy Machinery Plant is the only enterprise in the USSR producing drawing equipment. Its main products are drawing mills of 22 type-sizes for steel, copper and aluminum wire. These will be made in small series. The plant will also produce tube-drawing mills of seven type-sizes and winding equipment of ten type-sizes. (Narodnoye Khozyaystvo Kazakhstana, September 1960, pages 19-20)

PUMPS AND COMPRESSORS

Pump and Diesel Engine Export

If one were to draw lines on a map of the world from Andizhan to the countries supplied by the Strommashina Plant, it would be possible to trace the spread of the reputation of the S-245 pump and T-62 diesel engine. With each passing year more and more countries send their orders to Andizhan. Its diesel engines and pumps can be found in many countries of Asia, Africa and Europe -- in Albania, Bulgaria, the Mongolian People's Republic, Rumania, Viet Nam, Indonesia, Greece, Cambodia, Afghanistan, the Sudan, Iran, Burma, the United Arab Republic and Jordan.

Andizhan diesel engines and pumps have been shown many times at world industrial fairs. Last year, for example, the plant displayed its products at 16 international fairs and exhibits. Its diesel engines and pumps were in Turkey, Ceylon, Syria, Morocco and Ethiopia. Last year 124 diesel engines and 72 pumps were exported, while this year orders have already been placed for 450 diesel engines and

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Pump and Diesel Engine Export (cont'd)

135 pumps. The orders are still coming in. We shall quote some figures characterizing the popularity of this plant's products. In 1959 the plant delivered 29,000 rubles worth of spare parts for its machines, while now it will be shipping 200,000 rubles worth.

Diesel engines and pumps are being sent to Ghana for the first time. Iran will receive 100 diesel engines, and the United Arab Republic -- 150 diesel engines. Many are being sent to other countries. During the last few days the marketing division sent 14 pumps and diesel engines to countries of Asia and Africa . (Pravda Vostoka, 16 October 1960. Full translation)

New Compressor

The Sumskiy Machinery Plant imeni Frunze has been subjected repeatedly to serious criticism, and this has not been without grounds. At the plena of the CC of the CPSU and the CC of the CP of the Ukraine it was pointed out that the enterprise collective produces partiallly obsolete equipment. The plant collective has come to the correct conclusion from this criticism. In particular, the plant collective has developed a new type of compressor and is producing it with great enthusiasm. And there was reason for this enthusiasm. The new product, replacing the clumsy EG-100/200 compressor, runs at a higher speed, is more productive and is 74 tons lighter than the former model.

All the components and parts for the new compressor were produced at the plant from the beginning, but the shaft had to be ordered from another plant. The Khar'kovskiy Sovnarkhoz assigned the shaft production to two plants -- the Transport Machinery Plant imeni Malyshev and the Turbine Plant imeni Kirov. Six months went by since the plant sent the blank to Khar'kov, but no shaft was produced. They are sending letters to the directors of the Khar'kov plants, while those are establishing new deadlines and

New Compressor (cont'd)

promising to machine the shaft, but nothing is being done. Strange as it seems, the functionaries of the Khar'kovskiy Sovnarkhoz have not lifted a finger to see that the important order was filled without delay.

Unfortunately the hopes of the men of the Sumskiy Plant on cooperation with a third Khar'kov plant -- the Electromechanical Plant -- have not been realized. New highly-productive centrifuges, so essential to the chemical and sugar industries, were not assembled with the electrical equipment which was to be furnished by the Electromechanical Plant. Before the new sugar-refining season the Plant imeni Frunze was forced to send the centrifuges to the sugar mills without the electric motors. The sugar mills themselves managed to obtain the electrical equipment at the Khar'kov plant and sent trucks after it. Are the men of the chemical industry also to be forced to operate in this manner?

The Sumskiy Plant imeni Frunze, the Khar'kov Plant imeni Malyshev, the Turbine and Electromechanical Plants are all included in the Khar'kovskiy Sovnarkhoz. The quest-

New Compressor (cont'd)

ion arises as to whether the persons in charge of the sovnarkhoz are interested in each plant successfully carrying out the resolutions of the Party and moving along the path of technological progress. Why are they allowing such shortcomings to exist in inter-enterprise cooperation? (Pravda Ukrainy, 22 October 1960. Full translation)

High-pressure Compressor

The Leningrad Metal Plant has completed the assembly of a high-pressure compressor for a new 25,000 kw gas-turbine installation. This compressor will deliver air into the combustion chamber of the unit. (Leningradskaya Pravda, 18 October 1960)

Akmolinsk Pumps

The Akmolinsk Pump Plant is one of the few enterprises in the Kazakh Republic which was chosen to participate in the production of equipment for the development of large-scale chemical enterprises. In 1961, the plant is expected to almost double its output and to organize the production of 16 new types of pumps. However, it still produces pumps of obsolete design and uses manual labor for many operations at the plant. (Kazakhstanskaya Pravda, 29 October 1960)

Mobile Compressor Stations

The Chita Machinery Plant is producing 10 mobile compressor stations for an Indian firm. The plant has organized the production of the modern UKP-80 mobile compressor station without any aid from the Sovnarkhoz. (Sovetskaya Rossiya, 1 October 1960)

New Fuel Pump

The Noginsk Fuel Equipment Plant has organized the production of RNM fuel pumps. This pump is of simpler design and is easier to produce than its predecessors. (Leninskoye Znamya, 29 September 1960)

MISCELLANEOUS MACHINE CONSTRUCTION

Pskov Machinery Plant

At the Pskov Machinery Plant -- one of the largest of the Seven Year Plan -- the main unit has started operations. The productive capacity of the plant is being doubled. The plant collective has begun to produce machinery for the heavy chemical industry. (Sovetskaya Moldaviya, 1 October 1960, Full translation)

CHEMICAL INDUSTRY

New Boilers

The production of two powerful boilers with a capacity of 250 cubic meters each has been completed at the Ural'skiy Chemical Machinery Plant. These aggregates are designed for the Krasnoyarsk Cellulose-Paper Combine, which is in the process of construction. They are made of two-layer rolled steel with the inner layer of stainless steel. By the end of the year the men of the Ural'skiy Plant will produce two more of these boilers for the Krasnoyarsk Combine. Dozens of new machines are now being produced at the Ural'skiy Chemical Machinery Plant for other large chemical plants. (Sovetskaya Latviya, 16 October 1960. Full translation)

Shortcomings in the Chemical Industry

The Scientific-Research and Design Institute of Chemical Machinery Construction (director I. Salamatov), the All-Union Electrotechnical Institute imeni V. I. Lenin (director V. Biryukov), the State Committee on Automation and Machine Construction, the State Union Institute for Designing Metallurgical Plants (director K. Belyanchikov) and the State Economic Council Main Scientific Research Institute have many times failed to furnish technical documentation on time. In addition, the quality of finished plans is not always very high. Cases are quite common where the plans must be returned to the institutes for additional work, a fact which naturally delays the introduction of operations at new plants.

This is what happened with a new phthalic anhydride plant at the Rubezhanskiy Chemical Combine. The heating ovens were designed by the Rubezhanskiy branch of the Giprokhim Institute in such a manner that they did not thoroughly heat the converter. The plans had to be reworked, and this naturally delayed the beginning of production.

A serious shortcoming consists in the fact that the

hortcomings in the Chemical Industry (cont'd)

designers many times do not take the latest advances of science and technology into consideration. The Central Planning-Design Bureau of Chemical Machinery Construction, for example, issued technical documentation to the Kiev Bol'shevik Plant, which contained obsolete parameters for the unit for producing granulated polyethylene. The plant returned this technical documentation to be reworked.

Some cases are even worse. Machines are being produced according to plans which do not take into consideration the latest achievements of science and technology. Later these must be "modified" either at the supplier plant or at the plant which placed the order. For example, this was the case with the gas turbines produced by the Neva Main Gas Line Plant and with many units produced by chemical machine construction plants. (Ekonomicheskaya Gazeta, 1 October 1960. Partial translation)

Limestone Crusher

Chief designer V. Strel'tsov of the Vyksunskiy Crushing-Grinding Equipment Plant, Stalin Prize laureat, together with Engineer F. Silenko, designed in 1954 a new dual-rotor crusher. It is essential chiefly for transforming limestone into powder for fertilizing acid soils. Machinery had been produced previously but these were cumbersome grinding units weighing about eight tons. The crusher from the Vyksunskiy Plant will be several times more productive and weigh five tons less than the former models.

Three years ago in the Chelyabinskiy Rayon 25 test models of dual-rotor crushers under the index of S-379 were produced. Test results were successful. On the basis of the positive decision of the commission which conducted the testing, the SM-454I grinding units are being removed from production. In their place S-379 crushers are being produced. 100 units were delivered in 1958 and 15 in 1959.

The regulations on inventions and technical discoveries provide for cash payment to the inventors for the use of their inventions. But here is where the trouble starts. Chief engineer of the Machine Construction Administration

Limestone Crusher (cont'd)

of the Chelyabinskiy Sovnarkhoz, N. Isayev, without going further into the matter, put off the inventors with a formal note. After considerable delay, in 1958 he admitted that the dual-rotor crushers were being produced, but he refused to pay out the cash rewards. What was his motive? "The crusher parts wear out too rapidly."

But is that not a natural occurrence? There is no machinery which does not wear out. Crushers are also subject to wear. Naturally they contain certain parts which wear out sooner than others. In the meantime it has been established that the dual-rotor crusher parts wear out more slowly than in other grinding units. In other words, this is no excuse for refusing cash reward. Even more surprising is the statement by Comrade Isayev that series production on the crusher has not yet been decided on. Just what is it if not series production when the plant has already produced 140 crushers? Even if we assume that 140 machines does not mean series production, no monetary rewards have been paid out for them. (Ekonomicheskaya Gazeta, 22 October 1960. Partial translation)

Artificial Fiber Machines

The Pskov Machinery Plant has organized the production of seven new types of machines for artificial fibers. The plant recently shipped five such machines to synthetic-fibers enterprises in the Ryazanskiy, Barnaul'skiy and other sovnarkhozes. (Kazakhstanskaya Pravda, 29 October 1960)

New Filter

The All-Union Scientific Research and Design Institute for Chemical Machine Building has sent plans for a new filter with a 40 m^2 filtering area to the Sverdlovsk Uralkhimmash Plant. It is destined for filtering out poisonous substances from varnishes and paints.

The Institute has also designed an automatic filter with a 130 m^2 filtering area for purifying electrolytes, which are used for the non-ferrous metallurgical processes. (Vechernyaya Moskva, 6 October 1960)

MACHINE TOOLS

Presses

The Heavy Mechanical Press Plant is one of Dnepropetrovsk's young enterprises. It has spacious shops and unique equipment. However, there are many improvements that could be made in labor organization. An empty stand was demonstrated for us in the assembly shop in Foreman Popov's section. The brigade consisting of Bulkin, Marinets and Titarenko was to produce two P-760 presses on this day, but it did not even begin assembly, for basic parts were missing.

In this sector the P-797 press frame has been standing for days. The cylinder for this press arrived during the first ten days in August. The assemblers discovered two defects in it: a crack in the wall and an incorrectly drilled flange. The cylinder was returned to the mechanical shop for boring. In a few days it was returned, once again tested, and a leak was discovered once again.

In August 19 series of P-713 presses were to be assem-

Presses (cont'd)

bled. Only six were completed. The plan was underfulfilled. The shop's monthly program is being threatened. But they are used to that here. Soon the tempo will build up and then there will be no more evenings and Sundays free. This vicious practice has been going on here for a long time. For example, this is how the assembly shop operations have looked every ten days during the first six months. If we take total production as 100%, 8.7% of machinery was produced in the first ten days, 11.3% in the second, and 80% in the third. In other words, the first 20 days of the month resulted in practically no production. That is why the fitters are even sent out to do sweeping jobs. Toward the end of the month even the janitors are used for assembling machinery.

It is not at all surprising that complaints are constantly being made against the plant. The Khar'kov Svet Shakhtera Plant is complaining due to defective automatic machine casings, the Taganrog Woodworking Combine points out the unreliable time relays, the Shepetovskiy Woodworking Combine reports other press defects. Losses due

Presses (cont'd)

to defective production amounted to 2,330,000 rubles last year alone.

When the subject of defective equipment is brought up at the plant, the mechanical shop is usually pointed out as the culprit. It creates quite an impression indeed. The inter-spaces are cluttered up with parts, chiefly defective ones. They lie around sometimes for more than a year. There are few skilled lathe and milling machine operators left, for they have left the plant. The complex parts are machined by young and inexperienced workers. There are no technical training courses in the shop. The union organization pays little attention to training work in the collective.

For example, not long ago lathe operator Burdastyy made defective the eight-ton column of a P-449 press. When he was chided for this at a production meeting, he answered: "Quality should not be difficult. Our country contains many plants which produce presses. Much experience has been gained. It seems that it would be easier to travel and become acquainted with the operations of the leading enter-

Presses (cont'd)

prises and learn the most modern labor methods and incorporate them here. But for some reason this has not been done up to the present."

The K-117-E press is series produced by the plant. The same press is produced by the Barnaul Plant. In 1955, when the Dnepropetrovsk Plant was just beginning to produce, its representatives spent some time in the Altai. They brought from there, among other things, calculations of press production costs. The cost of producing one machine at the Barnaul Plant was 20,983 rubles at that time. Five years have passed since then. But even now the cost of the same press in Dnepropetrovsk is 28,266 rubles. If we compare a few figures we learn that the shop expenditures in Barnaul were 2,879 rubles, and in Dnepropetrovsk -- 4,835. Defective parts in producing one unit in the Altai amounted to 292 rubles, and here -- 1,143, that is, four times as great. We must assume that in the past five years the Barnaul Plant has not stood still, and that right now the K-117-Ye press costs even less.

The plant contains a large design section. It contains more than 120 persons. One would think that there

Presses (cont'd)

was someone to stand up for the honor of the plant's brand. But complacancy reigns here. The plant designers know very well that the P-797 press, designed for producing shield-doors, has long been obsolete. The consumer enterprises accept it only because they are in need of it. It is being used, as a rule, at 50 to 60% of its capacity. One would think that the time has long since passed when the question should be raised on replacing this press with a more modern one. However, the designers have proposed nothing new. (Trud, 29 September 1960. Partial translation)

New Azovskiy Forge-press Plant

Director Valentin Vladimirovich Nul'gin hesitantly talks on the plant's affairs, and from time to time a sad smile appears on his face. His two companions are also sad -- Chief Engineer K. Dikov and Chief of the Technical Section, M. Kreshchanskiy. It is obvious that all of them are tired of talking about the plant's needs and hurt that not all of their efforts to improve the situation are successful.

However, fact remains fact. Up till now the plant has not produced one series of new multi-position automatic machines. It is true that not long ago a model of a machine for making bolt heads was produced according to the plans of Design Bureau No 9. The model was successful in many respects and had great prospects for the future. But this was only a model. Who would produce a series of such automatic machines and when, was still an unknown factor.

"The matter lies in planning," M. Kreshchanskiy said, "We should specialize in producing multi-position automatic machinery for general metal products. This is realized by everyone. But look at what we are doing. We are doing what we must -- from various types of shears and

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New Azovskiy Forge-press Plant (cont'd)

machine tools for weaving wire coverings to automatic tablet machines for producing drugs.

Naturally shears and tablet-producing automatic machinery are also necessary for our country. We at the plant have nothing against such orders. The bad thing about it is that this auxiliary production has become the basic production here, and basic production has become auxiliary. What is even worse, things will not change in the near future, the way things look. If you look at the figures for the plant given by Gosplan, you only wonder. In 1961, for example, hundreds of machines are to be produced, including only a few dozen multi-position automatic machines. And these are primarily test models. When will these be produced in series, and when will these machines ultimately begin to produce themselves?" The causes for the backwardness of the Azovskiy Plant lie, however, not only in the errors of planning, and perhaps more in something else. A few days later I was talking about the forge-press automatic machine plant with the chief of the Machine Construction Administration of the Rostovskiy Sovnarkhoz, Vasin, and

New Azovskiy Forge-press Plant (cont'd)

Chief Engineer Vorobyev. Both of them, listening, nodded their heads affirmatively and then said almost in unison: "What else can you expect from a non-existant plant?" It is of course difficult to agree with such a categorical statement. The plant does exist. And its collective even today is capable of producing many more forge-press automatic machines. But what is true is true. The Azovskiy Plant does not yet possess a full technological complex. The entire production is concentrated basically in one small shop.

Design Bureau No 9 is no better off. If the forge-press automatic machine plant is the vanguard, the design bureau is the pioneer, blazing new trails in little-studied areas of working metals with pressure. The designers are right now huddling together in the unfinished shop. They have no experimental base whatsoever. It is not surprising that many poor plans come out of here, which cause just complaints on the part of the producers.

The Azovskiy Forge-press Automatic Machine Plant is only 25-30% complete, although it has been under construction for more than 12 years. On the spot of the mechan-

New Azovskiy Forge-press Plant (cont'd)

ical assembly and the engineering building designed for Design Bureau No 9 a lilac-colored potato field slumbers.

The local landscape has been "beautified" for a good ten years by the steel framework of the casting shop, the same casting shop which, beginning with next year, is supposed to supply a good third of all the enterprises of the Rostovskiy Sovnarkhoz with castings. Ten and one half thousand tons of metal have been turned over to the baking sun and frequent southern rains. The framework has been restored twice. It was painted and the completely rusted-through sections were cut off and replaced with new ones. Right now this is about to be done for the third time. Millions of rubles are frozen into this mass of steel. Tens of thousands have literally been thrown out the window. This is a rare and astonishing case of lack of economy! (Ekonomicheskaya Gazeta, 18 August 1960. Partial translation)

LOADING AND HOISTING MECHANISMS

Hydraulic Truck Crane

The L'vov Avtopogruzchik Plant has completed testing the new "4-056" hydraulic truck crane. It has a considerably greater hoisting capacity than the LAZ-690 truck crane, its predecessor. (Vechernyaya Moskva, 17 October 1960)

ELECTRICAL POWER EQUIPMENT

New Turbine

The Kaunas Pyargale Turbine Plant has made the first OR-0.3-2.5 turbine with a 300-kw capacity. All of its components have been welded from small parts, thus eliminating the necessity for large single-cast units. (Sovetskaya Litva, 28 October 1960)

New Gas Turbine

The Leningrad Ekonomayzer Plant has started testing a 1500-kw capacity gas turbine installation. It is a first unit of that type to be produced in the USSR, and it is designed for the production of electric power for the petroleum industry enterprises. The turbine will work with steam at 800 degrees and will have automatic controls. In 1961 the plant will produce a series of turbines of the new type. (Tashkent, Pravda Vostoka, 19 October 1960)

CONSTRUCTION AND EARTH-MOVING

Motor-graders

The Bryansk Road Machinery Plant has organized the production of 65-hp motor-graders with hydraulic drive. (Ekonomicheskaya Gazeta, 18 October 1960)

New Excavators

The Saransk Excavator Plant is organizing the production of tractor-mounted excavators. The first group of these machines has already been sent to consumers. (Ekonomicheskaya Gazeta, 13 October 1960)

TE-3 Excavators

The Ivanovo Peat Machinery Plant has made three TE-3 excavators and will start series producing them at the end of 1960. At present, the plant is developing the E-408 diesel-electric excavator-crane. (Sovetskaya Rossiya, 12 October 1960)

Heavy Motor Grader

The Orel Road Machinery Plant has made an experimental heavy motor grader designed for shaping road beds and railroad embankments. It is equipped with a 300-hp drive, hydraulic controls, and a three-axle drive. The motor grader is also equipped with various interchangeable units. (Ekonomicheskaya Gazeta, 6 October 1960)

Rotary Excavator

The Dmitrov Excavator Plant is currently testing a new rotary excavator. In 1960 the plant will produce 21 percent more excavators than it did in 1950. At present, the plant is planning to substitute the metal platforms of the EM-201 excavators with those made of reinforced concrete. (Leninskoye Znamya, 8 October 1960)

Electric Excavators

The Kovrov Excavator Plant has started the series production of multi-motor electric excavators. The experimental model of the excavator was successfully tested in Dzhezkazgan quarries. (Pravda Ukrainy, 30 October 1960)

Pneumatic Drive Excavators

The Tashkent Excavator Plant has completed the assembly of three experimental E-401 excavators with pneumatic drives. The operator's cab in each machine is air-conditioned. (Ekonomicheskaya Gazeta, 25 October 1960)

Ditch-cleaning Machines

The Mozyr' Irrigation Machinery Plant is preparing for the production of the KON-1200 blade-type ditch-cleaning machine, mechanisms for laying clay pipes in the ground to a depth of 1.5 meters, and machines for excavating drainage ditches 1-2 meters in depth. The plant will also make an experimental powerful ditch-digger for a DET-250 diesel-electric tractor. (Sovetskaya Belorussiya, 12 October 1960)

New Equipment

The Korosten' Oktyabr'skaya Kuznitsa Plant has recently started the production of improved D-437 grader-elevators to work in a unit with S-80 and S-100 tractors. It weighs two tons less and is 25% more productive than the old model. The new machine has electric and hydraulic controls and can be operated by a single person.

The plant is completing an experimental machine for the continuous removal of earth by layers and for transporting it to a distance of 16 meters. It can work by a shuttle method, or remove the earth at either end. The machine is equipped with hydraulic controls and can be operated by a single person.

The plant has also produced an experimental earth-carrying dump truck for a single-axle truck-tractor made by the Minsk Plant. Its capacity is 9-12 cubic meters or 18 tons of earth, which it can carry at 40 km/hr. This machine is highly maneuverable and requires very little space for turning around. The plant is also planning a number of other machines. (Pravda Ukrainy, 28 October 1960)

MISCELLANEOUS

Extending Machinery Life

The country's national economy is sustaining tremendous losses, since machinery life is rather short. Last year alone more than 135 billion rubles were spent on machinery renewal. How can we extend the length of service of equipment and mechanisms, make machinery reliable and economical? An article by engineer B. Kolesnikov in Ekonomicheskaya Gazeta on 22 September began a broad discussion on this problem, which has immense national significance. The author told how the Tatarskiy Sovnarkhoz is solving the problem of machinery durablility in its administrative-economic rayon.

Today the pages of our newspaper present Moscow scientists N. Dombrovskiy, M. Tenenbaum and K. Chudakov. The editorial staff asks other scientists to give their opinions on this important problem, as well as party and economic leaders, machinery specialists and sovnarkhoz functionaries.

Extending Machinery Life (cont'd)

We shall begin with the facts. On major repairs on industrial equipment alone last year about 60 billion rubles were expended. This is no cause for astonishment. The life of many machines is relatively short, and much labor, materials and money is expended on rejuvenating them. A curious thing is that 240 million rubles are spent annually on repairing single-scoop EGK-4 excavators, while only 180 million rubles of new excavators of this type are produced per year. The situation is similar in other branches of industry.

We shall now explain the causes for this. In all branches of the national economy and particularly in machine construction, new technology is being introduced. This is progressive technology, automation and telemechanics. One notes that machinery production technology is being perfected at a rapid rate, and repair technology -- extremely slowly. Amateurish work is blossoming everywhere. Even at specialized enterprises, major repairs on the Pobeda automobile, for example, cost one and one half times that of a new machine.

Extending Machinery Life (cont'd)

Immense expenditures on repairs are explained by the fact that parts wear out rapidly and their expenditure increases constantly. This year, for example, 350 million rubles' worth of various parts were to be produced for excavator repairs. But much more is needed. Therefore, repair enterprises are forced to produce spare parts themselves. The cost of the latter is considerably higher than the cost of those produced at machinery plants, and their durablility is two to three times lees. This means that spare parts production at specialized enterprises must be increased, and costs must be decreased. In the USA, for example, almost half of the excavator plants' capacities are used for producing spare parts, while we use only 10%.

It would be completely incorrect to see the problem of equipment durability as merely a lack in repair organization and technique, as well as in spare parts supply. Serious complaints must be made primarily to those enterprises which produce the machinery. The designers and technologists are working chiefly on decreasing the cost of new equipment. Reliability and durability have little interest for them. Why is this? This is because state

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Extending Machinery Life (cont'd)

planning includes only the basic inner-plant technical-economic indices and primary technical characteristics.

Machinery quality is judged according to capacity per unit of weight, speed, productivity, etc. The use of time qualities, that is, durability, as a rule is not regulated in production documents nor in national standards. Cases occur whereby enterprises begin to produce more powerful equipment, but this equipment is of short life, since some of the parts are the same as used previously, unable to withstand the new demands. As a result the economic effect of the introduction of new equipment is reduced to zero. If we can increase the length of service of tractors, motor vehicles, construction and road-building machinery by 18-20%, the state will save more than 30 billion rubles per year.

Our country is searching for methods to increase equipment life. At the Gor'kiy Motor Vehicle Plant they have applied new methods of machining parts surfaces, thanks to which they have become more durable. This saves 75 million rubles per year. At the Khar'kov Transport Machinery Plant

Extending Machinery Life (cont'd)

parts are strengthened by surface rolling. At the Uralmash, Leningrad Metal Plant and other enterprises plastic and metal-ceramic bearings are being used successfully, the service life of which is several times greater than bronze bearings.

However many of these new innovations are not being used throughout the country. There is a great cleavage between the technical potential of increasing machinery life and the use of this potential. In solving this national problem the main role should belong to design organizations and producer plants. At the same time machinery enterprises do not answer for the service life of the equipment produced by them. They merely establish a warranty period for the new machinery, which does not at all correspond to its actual life. The length of service of the basic parts of a modern motor vehicle is estimated at 80-300 thousand km, while the warranty period is only 15,000. In planning series production, state machinery testing is often done in such a short period that there is no possibility of correctly determining length of service. Contemporary experimental research methods are little used. Often unperfected machines are tested. For example, when the E-5010

Extending Machinery Life (cont'd)

excavator was delivered it was established that breakdowns increased its operational time, but the operations parameters of the E-302 excavator were not determined with the aid of registration devices. After such tests it is very difficult to judge how reliably it will operate during a long period of time and how much repairs will cost.

Some enterprises use simplified technology, weak materials and refuse to thermally and chemicothermally machine parts. They do this consciously in order to decrease the cost of the machinery. In the final analysis this leads to a shorter equipment life and an increase in operations expenditures, which are many times greater than the savings in production of "cheap" machinery. The cost of excavators from the Kovrovsk Plant have decreased from 90 to 63 thousand rubles during the last five years, but the quality of most of the parts has remained the same and even lessened, for the machinery life has decreased. Thus machinery durability is determined by planning and the technical level of its production, operations and repairs. The demand for high equipment durability is an essential condition for

Extending Machinery Life (cont'd)

the technological policy of Soviet machinery construction.

We think that the following should be done: first of all it would be logical to work out machinery life norms and require the enterprises to regulate the use life of the equipment produced according to national standards and plant technical conditions. In our opinion, in order to prepare government resolutions connected with the problem of machinery durability, as well as for coordinating the activities of various branches of the national economy, a special permanent organ should be formed within one of the USSR Council of Ministers committees.

Doubtlessly a positive part would be played by the organization of an all-union institute on machinery quality problems. It would cooperate in the incorporation in industry of simple and economical design decisions, perfected technology, progressive materials, methods of increasing durability, restoration, etc. Large economic regions should form base laboratories for solving important technical prob-
arising at local enterprises. At the same time, existing laboratories and scientific research institutes should be expanded also at plants engaged in the problem of machinery.

Extending Machinery Life (cont'd)

Machinery perfection, the choice of progressive materials and methods for making parts more durable, the testing of new design decisions demand standardization of test methods. Without this the use of rapidly-wearing materials, particularly plastics, will last for a long time. Little is being done to do research on materials and parts wearing out and friction. Without such a study it is impossible to solve successfully the problem of machinery durability.

Naturally the success of any project is caused by the personnel. Consequently, we should improve cadre training in the problems of the theory of machinery wear and the methods of increasing machinery life. It is also necessary to reevaluate the curricula of mechanical and technological faculties of institutions of higher education, as well as to devote more hours to the study of such subjects as machinery operations and repairs, and parts durability calculation.

It seems that a special magazine should have been published long ago which would illuminate the problems of the theory and practice of increasing machinery life.

Extending Machinery Life (cont'd)

Naturally we cannot illuminate all questions dealing with this problem, but we have mentioned only the chief ones, the organizational ones. We are fully convinced that the problem of durability, reliability and economy of machinery is such a critical one that the attention of all technicians, workers of science and industry should be drawn to the solution . . . . This is a matter of great national significance. (Ekonomicheskaya Gazeta, 7 October 1960. Full translation)

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